

## SAP SUCKING INSECT (THrips, APHIDS, JASSID) INFESTATION ON MUGA SILKWORM (*ANTHERAEA ASSAMENSIS*) HOST PLANTS ON SOM (*PERSEA BOMBYCINA*) AND SOALU (*LITSEA POLYANTHA*): A REVIEW

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### ABSTRACT

Sericulture is an agro-based industry and its end product of raw silk. Generally, raw silk is categorized into 4 types, such as mulberry, tassar, eri and muga. Among these, Muga silk is one of the highly demandable silks in the market. This golden yellow colour muga silk is produced by muga silkworm, *Antherea assamensis* species. Muga silkworm is an indigenous species for Assam, Northeastern part of India and it has very much contributed to the sericulture industry. They are semi-domesticated and multivoltine in nature. Som and soalu are the primary host plants for muga silkworms. Healthy food plants play a very important role in the growth and development of silkworm larvae. As well as, it is very much important for the production of good quality raw silk. These two host plants (Som and soalu) are infested by various insects and pests. Among these, one of the major is sap-sucking insects (thrips, aphids, jassid). This review mainly focuses on sap-sucking insect (thrips, aphids, jassid) affection of muga silkworm host plants, especially on som (*Persea Bombycina*) and sualo (*Litsaea polyantha*), also it covers the life cycle and control measure of these insects.

**KEYWORDS:** Muga Silkworm, Som, Soalu, *Antherea Assamensis* & Control Measure

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### INTRODUCTION

Muga silkworm, *Antherea assamensis* is one of the important species for Assam and as well as Northeastern part of India. The climatic condition of the northeastern region is very much suitable for muga cultivation. The golden yellow colour of silk is produced by muga silkworm, this silk has high demand in the market. Generally, muga silkworm is cultivated in outdoor conditions, semi-domesticated in nature (Singh *et al* 2013). It is a multivoltine insect and feeds a broad range of host plants. Muga silkworm is cultivated in different types of host plants. Among these, som (*Persea bombycina*) and soalu (*Litsea polyantha*) are the primary host plant for muga silkworm. Moreover, it has secondary (*Litsea salicifolia*, *Litsea citrate*) and tertiary (*Cinnamomum obtusifolium*, *Cinnamomum glaucescens*, *Zizyphus jujuba* etc) host plants. But, normally farmers prefer primary host plants (Som and soalu)(Neog *et al* 2005). All the host plants are distributed in different parts (Assam, Meghalaya, Manipur, Tripura, Nagaland, Arunachal Pradesh, West Bengal) of the region (Borgohain 2015). Host plants play a vital role in the growth and development of the silkworm body and the making of superior quality raw silk. That's why it is very much important to control the attack of insect pests in the silkworm host plants. Som and Sualo (Primary host plants) are faced lots of problems due to infestation by the Hemiptera and Thysanopteran insects (Saikia 1998). It includes aphids (*Aphis craccivora* Koch), thrips (*Liothrips litseae* Moulton, *Thrips tabaci*) jassid (*Ambrosia bagatelle* Ishida, *Empoasca binotata* Pruthi) (Singh *et al* 2013). These sap-sucking insects affect the som and soalu by sucking the leaf sap and wilting the leaves. The symptoms look like leaf margin rolling & curling. The aphid causes significant damage to the leaf bud of terminal branches (Singh and

Thangavelu 1994). It is difficult to control the pest but we can reduce the attacking percentage by taking some control measures.

### Aphids

It is one of the major pests of som and soalu (Muga silkworm hostplants). It belongs to the order Hemiptera and family Aphididae (Singh *et al* 2013). They are very small in size with soft bodies. Some of them are winged and some are wingless. Generally, the aphids are active from November to April. The growth starts increasing from the middle of November and it is high in March. Again, it is slowly decreasing in April. In the case of wingless, it requires 11-14 days for completed Nymphal development and 14-19 days required for completion of winged forms nymphal development (Singh and Saratchandra 2011). They suck the cell sap from soft leaves and affect the leaves' quality. The secret is the honeydew on the leaves and then attract the ants which ultimately leaves become not suitable for rearing. As well as honeydew becomes the source for the development of various fungus infections in the plants. They have a pair of cornicles and it is called siphum-culus. Apids may be brown, green, yellow, or black and they have darker pigmented blotches on the abdomen position (Singh and Thangavelu 1994). Aphids secrete the honeydew through the anus and they are secreted on the leaves, it becomes sticky.

- *Aphis craccivora* Koch = (*Aphis leguminosae* Th.)

The aphids are very small in size. It measures about 2.5 to 2.7 mm in length. The wingless aphid has black cornicles, large eyes. In the case of wingless, It requires 11-14 days for completed Nymphal development and 14-19 days required for completion of winged forms nymphal development (Singh *et al.*, 2004). The pest is very much active from middle of the November to March. They suck the cell sap from the buds, soft leaves, and twigs. The strength of the plant is reduced and leaves become unsuitable for rearing purposes. They secrete honeydew on the leaves and it has become the source of fungal infection such as black fungus (Singh *et al* 2013).

### Control Measure

Chemical control is difficult due to it can affect the silkworm. But for severe attacks of aphids, We can spray 250 ml of Malathion 50 EC or 150 ml of Dimethoate 30 EC or 15 ml of Oxydemetonmehtyl 25 EC in 80 liters of water per acre (Singh *et al* 2004). Proper field sanitation is necessary. Biocontrol agents such as insect predators, pathogens, and parasitoids can be used against several aphids (Singh *et al* 2000).

### Thrips

Thrips are the major pest for muga silkworm host plants. It belongs to the order Thysanoptera and the family Thripidae (Singh *et al* 2013). They are small in size and range from 0.5 to 1 mm in size. Thrips are also called physapoda. The sclerotic cuticle has covered the body of thrips and the integument shows characteristic sculptured patterns. The head is situated below the mouth cone and it is hypognathous. In the case of thrips, sutures are absent in the head capsule. They have compound eyes and it is composed of a varying number of ommatidia. Three ocelli are present in winged species. They have antennae and it is 6 to 9 segmented. The mouth cone is produced by the labrum and the labrum is oblique triangular, asymmetrical (Sarmah *et al* 2005). The prothorax and genitalia are well developed. The abdomen is made up of distinct segments and rudimentary eleventh. The female is larger than males. Thrips act as vectors of some fungal, viral, and bacterial diseases of plants. Generally, two types of thrips are affecting more in the case of som and soalu plants. It includes Liothrips litseae Moulton and Thrips tabaci (Singh and Saratchandra 2011).

- *Liothrips litseae* Moulton

It is a polyphagous pest of soalu (*Litsea polyantha*) plants. They are mostly active in March, April, July. They completed the life cycle in five stages i.e. I instar larva, II instar larva, prepupa, pupa I, and pupa II. They are laying the eggs in clusters and whitish in color. The colour of the larvae is yellow in color and the whole life cycle is completed within 18-25 days (Singh *et al* 2004). In the early stages, this pest occurs in the upper surface of the leaves and feeds the cell sap through mandibles. In later stages, they used labrum and maxillary styles for sucking the fluid from the cell layers of the leaves. After increasing the population of thrips, they shifted towards the tip portion of the leaves and feed voraciously. Generally, they damage the epidermis severely. Affected leaves appear small brown patches & infested portion dries up (Singh *et al* 2013).

- *Thrips tabaci*

It is a common thrips and profusely available in the som, soalu plants. *Thrips tabaci* are active throughout the year but population high in October & November. Females have long wings with long hair and they lay 50-60 eggs. The living period of females is 20 to 30 days. Males are wingless. Nymphs are yellowish-brown in colour and slightly smaller. Adults are 1 mm in length and yellowish-brown in colour (Singh and Saratchandra 2011). Generally, nymphs are preferring to feed on the lower surface of the leaves. After four stages, nymphs are fully grown within 5-6 days. Then, they moved to the ground and pupate in the soil at a depth of 20 to 25 mm (Singh *et al* 2004). They are multivoltine in nature. The pest infests the soft, succulent leaves and leaves become wrinkled and fall off. Moreover, it acts as a vector of viral infection also.

### **Control Measure**

In fields, light traps can be used to control the thrips. The rearing field should be clean and neat. Proper field sanitation is necessary (Singh and Saratchandra 2002). Water pan yellow trap can be used for trapping the thrips (Singh *et al* 2013). Application of malathion 50 EC @ 0.05 and waiting period should be done at least 10 days before brushing. In muga plantation, spraying of 250 ml Methyl parathion 50 EC in 250 liters of water per acre. The waiting period should be done at least 7 days before the feeding of the silkworm larvae (Singh *et al* 2000).

### **Jassid**

Jassid is one of the major pests of som and soalu plants. It is also called as leafhopper. It belongs to the order Hemiptera and the family Cicadellidae (Sarmah *et al* 2005). Normally, two types of thrips affect more in the case of som and soalu plants. It includes *Ambrosia bagatelle* Ishida and *Empoasca binotata* pruthi.

- Jassid; *Ambrosia bagatelle* Ishida

It is one of the most harmful pests of muga silkworm host plants. The females are laying 15 to 30 nos of the egg at the lower surface of the leaves. The egg is hatching within 5 to 11 days and gives rise to nymphs. Generally, nymphs are very active and suck the cell sap from the lower surface of the leaves (Singh *et al* 2004). Nymphs are passes through six stages in 7 to 21 days. After transformation into an adult, they live for 6 to 7 weeks. Adults are feeding on the plant juice. This pest has seven generations in a year. During feeding nymphs and adults, they inserted the toxic saliva into the plant tissues. Affected leaves become yellowing in colour, bronzing, and drying of leaves. The plants become stunted and cause complete mortality of the plant (Singh and Thangavelu 1997).

- Jassid; *Empoasca binotata* Pruthi

It is one of the destructive pests of muga silkworm food plants. They mate early in the morning and late in the evening. Female lays about 15 to 30 eggs. The egg period is 5 to 11 days. They have 5 nymphal instars (Singh and Saratchandra 2011). The nymphal period is shorter in Autumn (about 7 days) and a little bit longer in Winter (21 days). This pest has ten generations in a year. Nymphs and adults both affect the leaves, they suck the sap from the lower surface of the leaves. Affected leaves become yellowing, curling, bronzing drying up of leaves and plants become stunted (Singh *et al* 2013).

### **Control Measure**

Field sanitation is necessary. Spraying of 350 ml Malathion 50 EC or 240 ml Dimethoate 30EC or 75 ml Phosphamidon 85 WSC in 100 liters of water per acre should be followed (Sankar *et al* 2007). Application of phosphamidon 0.05 thrice at 10-day intervals to control the pest and we can use Carbaryl (0.1%), toxaphene, endrin, etc to manage the pest infestation (Singh *et al.*, 2000).

### **CONCLUSIONS**

Muga silkworm, *Anteraea assamensis* Helfer is an indigenous species to Assam, North Eastern region of India. Environmental conditions, healthy seeds, and healthy host plants are the major elements for completing one successful life cycle of muga silkworm. Among these, host plants play an important role in the growth & development of the silkworm larvae. Recent research concluded that various insect pest is the major problem for muga silkworm cultivation due to heavy infestation of host plants. Among these, sap-sucking insects such as thrips, jassid, aphids are serious pests. That's why managing insect pests by using is scientific method is very much important for the protection of muga silkworm host plants.

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